UNITED STATES DISTRICT COURT
DISTRICT OF MASSACHUSETTS

UNITED STATES OF AMERICA,	)	
	)	
v.	)	Nos. 16-cr-10305-NMG
	)	23-cv-12267-NMG
MARTIN GOTTESFELD,	)	
Defendant.	)	

DECLARATION RE DATA AND TABLES

Declaration Text

1.   This declaration serves as a detailed and transparent exposition of the computer-assisted methodologies used to reach detailed conclusions about the randomness of case assignments in the U.S. Court of Appeals for the First Circuit, including the assignment of the direct appeal of the above-captioned case. It is meant to provide the detail necessary for review, testing and replication of the results. For a much conciser summary of the key conclusions, *see* the accompanying Declaration re First Circuit Case Assignments (Feb. 1, 2024), Exh. D.

2.   I am Martin Gottesfeld; my relevant education and experience began when I wrote my first computer program at age five.

3.   I first sold my programs professionally at age 12.

4.   At 15, Intel hired me to help teach a continuing-education-credit technology course for Andover, MA public-school teachers.

5.   Earlier that year Phillips Academy Andover and Phillips Exeter Academy admitted me on scholarship.

6.   I matriculated to Exeter, where I continued programming professionally in my spare time.

7.   That same year, 1999, I first installed and began using Linux.

8.   Exeter integrates combinatorics into its standard math curriculum beginning in precalculus, which I completed in an accelerated program for the best math students.

9.   In 11th grade I scored the highest-possible mark, a five, on the Advanced Placement (A.P.) Computer Science A/B exam, won Exeter's prize for Achievement in Computer Science Beyond the A.P. Level at an unprecedented young age, largely for my work on A.I. in game theory, and I was admitted to the Advanced Placement/Early Admissions ("AP/EA") summer program at Carnegie Mellon University.

10.   At 18 I took a full-time job as the senior systems integrations engineer at Amnet Voice & Data Systems in Stamford, Connecticut.

11.   From that time in February 2003 until January 2016 I computer programmed and designed and built computer networks professionally as my primary focus.

12.   I have supported at the tier-three level and above a wide variety of business applications, including databases and their downstream applications.

13.   I attained industry certifications from Cisco, Citrix, Sonicwall and Research in Motion (Blackberry).

14.   My expertise includes search and sorting algorithms, regular expressions, Structured Query Language (SQL) and data sanitization,

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validation and migration; my clients included major hospitals and universities, government entities and publicly traded companies.

15.   *LexisNexis* ("Lexis") is essentially a database product, wrapped in a proprietary user interface, supporting a query syntax similar to regular-expression ("RegEx") matching.

16.   At the times relevant for the data and tables, *below*, I had a combined 40 months' experience using Lexis, particularly its federal-court folios. This experience encompassed hundreds if not thousands of hours.

17.   In 2018 The Honorable U.S. District Judge Nathaniel M. Gorton found me a sufficiently capable litigant to order me, over my objection, to defend myself in a criminal case.

18.   Lexis is one of the most complete extant repositories of U.S. courts' decisions and precedents, both published and unpublished, for a wide variety of matters, *e.g.*, pre- and post-trial motions and appeals.

19.   Based on my deep familiarity with Lexis, it is a robust data source for the uses detailed herein, providing more than an adequate sample of the relevant data.

20.   The government seems to consider Lexis a constitutionally sufficient law library, because, in many instances, it is all that the government offers unrepresented federal prisoners.

21.   To calculate reasonably accurate probabilities for specific appellate judges' assignments to cases decided on specific dates, I produced, as follows, the table Attributed First Circuit Panel Decisions Per Year and By Selected Judges, Attachm. 1, using Lexis

version 3.4, Folio Views 4.7.0.8 and a version of the folio for the U.S. Court of Appeals for the First Circuit containing decisions up through 2021 U.S. App. LEXIS 24976 (Aug. 20, 2021).

22.   The *Circuit*-column data for full-year rows were provisionally filled by running the advanced search *[Field: Judges]* to exclude unattributed decisions, *e.g., DeBarros v. Frank*, 2021 U.S. App. LEXIS 23529, No. 21-1090 (1st Cir. May 21, 2021), then manually recording the number of hits for each folio branch (year).

23.   The judges'-columns data for full-year rows were provisionally filled by running advanced searches for each judge, *e.g., [Field Judges:lynch]*, then manually recording the number of hits for each folio branch (year).

24.   The partial-year data were provisionally filled by checking one folio branch (year) at a time, then running an advanced search for each column against only the checked branch, *e.g.,* I checked *1995*, hit F3 (advanced search), entered *[Field Date:>1995-05-08][Field Judges:]*, manually recorded the number of hits in the *Circuit* column for *Post-Lynch '95*, then entered *[Field Date:>1995-05-08][Field Judges:lynch]*, manually recorded the number of hits in the *Lynch* column under *Post-Lynch '95*, etc.

25.   In the example, *above,* ¶ 24, I provisionally filled the *Pre-Lynch '95* data by manually recording the differences between the full-year data and the *Post-Lynch '95* data.

26.   I verified the dates when new judges first appeared in attributed decisions using *[Field Judges:…]* searches, scrolling to the bottom, then looking for out-of-date-order results.

27.   I compiled a list of all First Circuit judges and senior judges from 1995 onward, ran a search for attributed decisions excluding them all, i.e. *[Field Judges:^(aldrich|barron|boudin|bownes| campbell|coffin|cyr|howard|kayatta|lipez|selya|stahl|thompson| torruella|lynch)]*, and noted the following anomalies:

    a) in 2012 a special master published an attributed decision, 2012 U.S. App. LEXIS 26981;

    b) in 2015 a case involving inordinate publicity was decided by an entire panel sitting by designation, *United States v. Casallas-Toro*, 807 F.3d 380; and

    c) an apparent data-entry error left a decision attributed to "Judge1, Judge2, and Judge3," *Smith v. Colvin*, 2016 U.S. App. LEXIS 16933.

    In adjustment, I deducted one from the *Circuit* column for each of the years 2012, 2015 and 2016.

28.   I reviewed the Lexis autocomplete options for *[Field Judges:* and found numerous misspellings of Torruella and a possible misspelling of Selya as "Selva."

29.   Further review found Torruella misspelled in one decision in each of the years 2003, 2006 and 2007, as well as in years before those of interest. In adjustment, I added one to the *Torruella* column for each year 2003, 2006 and 2007.

30.   Further review found zero cases in the years of interest attributed to Judge Selva and that before those years a district judge surnamed Selva had sat by designation. Based on these findings I made no adjustments due to Judge Selva.

31.   To adjust for decisions *en banc*, I compiled lists each of four-plus "active" First Circuit judges for time periods spanning the years of interest then ran advanced searches for decisions attributed to every judge on each list:

  a) for '95-'00 *[Field Judges:(boudin selya stahl torruella)]*;

  b) for '01-'06 *[Field Judges:(boudin lipez lynch stahl torruella]*;

  c) for '07-'12 *[Field Judges:(boudin howard lipez lynch torruella]*;

  d) for '13-'19 *[Field Judges:(howard lipez lynch Thompson torruella]*; and

  e) for '20-'21 *[Field Judges:(barron howard kayatta lipez lynch thompson)]*.

32.   Thereby I noticed that, though Judge Lipez has never been labeled a senior judge, he is listed in under a quarter of the decisions *en banc* since 2013. Similarly, though Judge Selya stopped being listed as a senior judge in 2008, most decisions *en banc* issued since then do not list Judge Selya. I thus updated two of the above queries:

  d) for '13-'19 *[Field Judges:(howard lynch thompson torruella)]*; and

  e) for '20-'21 *[Field Judges:(barron howard kayatta lynch thompson)]*.

33.   For every hit in the above searches, ¶¶ 31-32, through 2006, I deducted one from every column in the corresponding year.

34.   For every hit in the above queries, ¶¶ 31-32, from 2007 through 2013, I deducted one from every column except *Selya* in the corresponding year.

35.   For every hit in the above queries, ¶¶ 31-32, from 2014 onward, I deducted one from every column except *Selya* and *Lipez* in the corresponding year.

36.   I then added Selya to the above searches, ¶¶ 31-32, for 2007 onward, *e.g.*, for 2007 through 2012, *[Field Judges:(boudin howard lipez lynch selya torruella)]*, and deducted the results accordingly from the *Selya* column.

37.   I then added Lipez to the above searches, ¶¶ 31-32, for 2014 onward, *e.g.*, for 2014 through 2019, *[Field Judges:(howard lipez lynch thompson torruella)]*, and deducted the results accordingly from the Lipez column.

38.   I further considered limiting results to decisions marked in Lexis as reported in the Federal Reporter or Federal Appendix, i.e. *[Field Cite:f.|f.2d|f2d|f.3d|f3d|f.4th|f4th|appx]*, but I found this would exclude decisions unreasonably, *e.g.*, *Mayhew v. Sebelius*, 2010 U.S. App. LEXIS 21083, No. 12-2059 (1st Cir. Sept. 13, 2012). I thus rejected the idea.

39.   Because one case may result in multiple decisions, I considered excluding second and subsequent decisions in a case. But I found that, frequently, at least one panel member changed between such decisions, as happened between *Mayhew, supra*, and its subsequent decision 772 F.3d 80. I thus rejected the idea; any effects from

residual repetitions should average out in this volume of decisions and be without meaningful impact on odds calculations.

40.   I then considered the data finalized for Attributed First Circuit Panel Decisions Per Year and By Selected Judges, Attachm. 1.

41.   I conclude beyond reasonable doubt that significant periods lapsed in which any "random" assignments of active circuit judges were, at best, weighted to produce different, pre-determined case loads for different judges. *See, e.g.,* the 2009 data, with a 50-decision difference between Howard (197) and Lynch (147) and a 73-decision difference between Howard and Selya (124). *See, also,* the 2017 data, with 34 decisions separating Torruella (190) from Lynch (156) and 117 separating Torruella from Lipez (73).

42.   Thus, to approximate the odds of a particular judge's assignments to a given case as 3:n, where n is the number of then-active judges, would produce unreliable results.

43.   Compounding matters, my analysis found years wherein over 150 decisions were made by panels including First Circuit senior judges, *e.g.,* 1998 saw 340 such decisions, more than half the year's total, and five decisions that year were made exclusively by First Circuit senior judges, without an active judge on those five panels.

44.   Also, in some years over 100 decisions were entered by panels including at least on judge from another court sitting by designation.[1] In 2008, *e.g.,* 248 decisions, the majority, were entered by such panels and 146 were entered by panels with one or more First Circuit senior judges.

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[1] *See* 28 U.S.C. §§ 291 *et seq.* (circuit judges and designations).

45.   Thus, more accurate odds of assignment than 3:n are approximated from Attributed First Circuit Panel Decisions Per Year and By Selected Judges, Attachm. 1. *E.g.*, in 2000, Judge Lynch's approximate odds of assignment were 1:3 (160:480) and Judge Torruella's were 5:12 (200:480).

46.   I produced the table First Circuit "HHS" & Similar Decisions Per Year and By Judges Lynch & Torruella, Attachm. 2, as follows, using the same Lexis system.

47.   I chose Judge Torruella as Judge Lynch's closest analog for assignment probabilities due to their largely overlapping times on the court and because Torruella's data diverges the least from Lynch's in Attributed First Circuit Panel Decisions Per Year and By Selected Judges, Attachm. 1.

48.   The full-year *Circuit*-column's data for First Circuit "HHS" & Similar Decisions Per Year and By Judges Lynch & Torruella, Attachm. 2, were provisionally filled by running the advanced search *[Field CaseName:"health human services"/4|hhs|sebelius|"marylou sudders"/3| polanowicz|"catherine hutchinson"/3|"william o'leary"/3|"christine ferguson"/3][Field Date:>1995-05-08][Field Judges:]* then manually recording the number of hits for each folio branch (year).

49.   I had already determined that, in the years of interest, then-current and former U.S. H.H.S. secretaries Xavier Bacerra, Alex Azar, Syliva Burwell, Tommy Thompson, Michael Leavitt and Louis Sullivan always appear titled in the First Circuit folio's *CaseName* field so as to match *"health human services"/4|hhs* in the above search, ¶ 48, but that Kathleen Sebelius sometimes appears titleless.

50.   I had already also determined that the Massachusetts state H.H.S. officials named in the above search, ¶ 48, sometimes appear titleless, *e.g.*, Marylou Sudders. I gleaned these names from memory and a thorough review of the district court folio and omitted none that I found therein.

51.   The full-year judges'-columns data data in First Circuit "HHS" & Similar Decisions Per Year and By Judges Lynch & Torruella, Attachm. 2, were provisionally filled by specifying *[Field Judges:lynch]* then *[Field Judges:torruella]* in the above search, ¶ 48, and manually recording the number of hits for each folio branch (year) in the corresponding columns. I pre-established that Torruella was not misspelled in any H.H.S. cases.

52.   The partial-years data were provisionally filled in First Circuit "HHS" & Similar Decisions Per Year and By Judges Lynch & Torruella, Attachm. 2, in like manner as above, ¶¶ 24-25.

53.   I established that no adjustment was necessary for relevant decisions *en banc* because there were no such decisions in the years of interest.

54.   I then considered the data finalized for First Circuit "HHS" & Similar Decisions Per Year and By Judges Lynch & Torruella, Attachm. 2.

55.   For each decision in First Circuit "HHS" & Similar Decisions Per Year and By Judges Lynch & Torruella, Attachm. 2, I have recorded the decision's date, case name and number or numbers, panel composition, citation and author, if attributed, in First Circuit "HHS" & Similar Decisions Postdating May 8, 1995, Attachm. 3.

56.   I produced the table First Circuit "Massachusetts"—"HHS" & Similar Decisions Postdating May 8, 1995, Attachm. 4, using the same Lexis system by manually recording the results of an advanced search designed to find decisions relevant to Massachusetts H.H.S., as distinguished from federal H.H.S. and other states' H.H.S. departments: *[Field CaseName:(("health human services"/4|hhs| sebelius)&(massachusetts|baker|patrick|romney|weld))|"marylou sudders"/3|polanowicz|"catherine huthinson"/3|"william o'leary"/3|"christine ferguson"/3][Field Date:>1995-05-08][Field Judges:].*   *See,* above, ¶¶ 49–50 (discussing why some names appear and others do not in my H.H.S. advanced-search queries).

57.   I produced the table Reviewed First Circuit "DCF"-type Decisions Postdating May 8, 1995, Attachm. 5, using the same Lexis system by reviewing in their entirety the results of advanced searches including

   a) *dcf|dss|cps;*

   b) *"children families"/3;*

   c) *"children youth families"/4;*

   d) *"department social services"/5|"dept. social services"/5|"social services dept."/5|"social servs."|"soc. servs."|"soc. srvcs.";*

   e) *"children families"/4;*

   f) *"child prot*";*

   g) *"department of the family"|"dept. of the family"|"departamento de la famil*"|"family department"|"family dept.";* and

h) *deveney|"linda spears"/3|"olga roache"/3|"garrett mcmanus"/3|"angelo mcclain"/3"|"lewis spence"/4|"angelo mclain"/3.*

58.   I manually reviewed each resultant decision's subject matter and excluded decisions that—

a) matched only due to the name of another authority cited therein, *e.g., Currie v. Group Ins. Comm'n*, 290 F.3d 26, citing *DeShaney v. Winnebego County DSS*, 489 U.S. 189 (1989);

b) matched only due to other meanings for search terms, *e.g., Green v. Ablon*, 794 F.3d 133, 139 (CPS stands for "Collaborative Problem Solving");

c) matched only by referencing out-of-circuit agencies, *e.g., Mandel v. Boston Phoenix, Inc.*, 456 F.3d 198, 202 (mentioning Baltimore County, MD, DSS in defamation suit);

d) were dismissed unattributed to any judge, *e.g., Amadhi v. Dep't of Children & Families*, 2019 U.S. App. LEXIS 23641 (1st Cir. Apr. 1, 2019) (dismissed for failure to pay filing fee or submit application to proceed without fees);

e) were summarily disposed-of by entry of judgment without publication of an opinion or order, *e.g., Amadhi v. McManus*, 2017 U.S. App. LEXIS 27467, No. 16-1960 (1st Cir. Oct. 16, 2017) (summary disposition denying injunction);

f) matched only by distinguishing themselves from potentially relevant decisions, *e.g., Roldan-Plumey v. Cerezo-Suarez*, 115 F.3d 58, 66 (1st Cir. 1997) (discussing holding in social-

services case *Gonzalez-Gonzalez v. Zayas*, 878 F.2d 1478 (1st

Cir. 1989) (*en banc*));

g) matched only outside the social-services context, *e.g.*, *Estate*

of Abraham v. Comm'r, 408 F.3d 26 (1st Cir. 2005) (estate-tax

case mentioning "children" and "families"); or

h) matched unintended persons, *e.g.*, *Vasquez-Castro v. Office of*

Gen. Counsel, 2018 U.S. App. LEXIS 37454, No. 17-1983 (1st

Cir. June 15, 2018) (matches P. Deveney, an F.C.I. Berlin case

manager, not Erin Deveney, former interim Massachusetts DCF

commissioner).

59.   I produced the table Filtered First Circuit "DCF"-type

Decisions, Attachm. 6, by selecting from the results of the above

searches, ¶¶ 57-58, every civil (non-habeas, non-immigration-review)

decision with minors or their custodians as parties or likely

financial beneficiaries and involving child-abuse or -custody

proceedings.

60.   I produced the table Filtered First Circuit "DCF"-type

Decisions in Mass. Cases, Attachm. 7, by selecting from the above

searches, ¶¶ 57-58, every civil (non-habeas, non-immigration-review)

decision in a Massachusetts case with minors or their custodians as

parties or likely financial beneficiaries and involving child-abuse or

-custody proceedings.

61.   I produced the table Reviewed First Circuit "DCF"-type

Decisions in Mass. Crim. and Hab. Cases Postdating Aug. 1, 2011,

Attachm. 8, by selecting from the above searches, ¶¶ 57-58, every

criminal or habeas decision in a Mass. case postdating Aug. 1, 2011.

62.   I produced the table Reviewed First Circuit "DCF"-type

Decisions in Mass. Cases Per Year and By Judges Lynch & Torruella,

Attachm. 9, by tallying from the above searches, ¶¶ 57-58, every

decision in a Massachusetts case postdating May 8, 1995, by year and

partial year, as appropriate, and counting the appearances therein by

Judge Lynch and Judge Torruella.

63.   I produced the table First Circuit "Massachusetts"

"Developmental Services"-type Decisions Postdating May 8, 1995,

Attachm. 10, as follows.

64.   I manually recorded the results of the Lexis advanced search

[Field Date:>1995-05-08][Field CaseName:massachusetts&("mental

retardation"|"developmental services"|"mental health")][Field

Judges:]. For information on the Mass. Department of Developmental

Services and its predecessor agency the Mass. state Department of

Mental Retardation, *see, e.g., Conille v. Council 93, AFSCME*, 935 F.3d

1, 3 n. 3 (1st Cir. 2019).

65.   I then combed the district and circuit folios for the names

of current and former heads of the Dept. of Developmental Services and

its predecessor agency.

66.   Using the names found, I augmented the above search, ¶ 64.

E.g., by adding "*Elin Howe*"/3, I found *Voss. V. Rolland*, 592 F.3d 242

(1st Cir. 2010).

67.   I recorded in First Circuit "Massachusetts" "Developmental

Services"-type Decisions Postdating May 8, 1995, Attachm. 10, every

decision naming the Mass. Dept. of Developmental Services, its

predecessors or their then-staffers as parties, omitting none that I found.

68.   I produced the table Reviewed First Circuit "Harvard College"-type Decisions Postdating May 8, 1995, Attachm. 11, as follows.

69.   I manually recorded every result of the advanced search *[Field Date:>1995-05-08][Field CaseName:"harvard university"|"harvard medical"|"harvard college"|"harvard cancer center"][Field Judges:]*.

70.   I recorded data from every result and summarized every decision from the above search, ¶ 69, except *Rafi v. Brigham & Women's Hosp.*, 2018 U.S. App. LEXIS 37335, No. 17-1373 (Feb. 16, 2018), because it is a judgment without a published order or opinion. *See,* above, ¶ 58 (exclusion criteria).

71.   I then produced the table Filtered First Circuit "Harvard College"-type Decisions Postdating May 8, 1995, Attachm. 12, by filtering out the manifestly futile cases, i.e.

1)   *Doe v. Harvard*, 95-1152 (dismissed as frivolous);

2)   *Afrasiabi v. Harvard Univ.*, 99-1295 (plaintiff had been arrested by Harvard Police after poorly conceived extortion attempt);

3)   *Rubin v. Islamic Republic of Iran*, 11-2144 (attempt, after securing default judgment against foreign nation, to attach antiquities in third-party museum's or museums' care, custody and control, in which the foreign nation had never claimed an ownership interest); and

4)   *Walker v. Presidents & Fellows of Harvard College*, 15-1154
(seeking expungement of plagiarism finding despite school's
unambiguous policy on plagiarism specifying exactly such a sanction).

72.   To plumb these data further, I created CSV.zip, Attachm. 13
and CSV.zip.sha256, Attachm. 14 as follows.

73.   I wrote a multi-process, multi-threaded computer program in
the C language to simulate random case assignments. This program is
contained in the files inside CSV.zip, Attachm. 13, whose names end in
".c" and ".h".

74.   I seeded the program with the observed First Circuit panel
assignments from Attributed First Circuit Panel Decisions Per Year and
 By Selected Judges, Attachm. 1. *See* circuit_data.h at lines 18,
(defining circuit_judges and filling it with judges' appearance data),
114 (defining circuit_data and filling it with total years and per-
judge data), CSV.zip, Attachm. 13.

75.   I further seeded the program with the observed First Circuit
panel data from the other attachments. *See id.* at lines 150–633
(defining and filling mass_hhs_case_dates, mass_dcf_case_dates,
mass_dds_case_dates, mass_hhs_dcf_dds_case_dates, harvard_case_dates,
harvard_and_mass_hhs_dcf_dds_case_dates, hhs_case_dates,
dcf_case_dates and hhs_and_dcf_case_dates).

76.   I set the program to run a billion simulations of the
assignments in each set of cases. *See* calc.h at line 20 (defining
NUM_ITERATIONS as "1000000000" or 1,000,000,000).

77.   I set the program to output the results of each set of
simulations into a distinct comma-separated values (C.S.V.) computer

file. *See* calc.c at lines 522-600 (program set to run each case set individually and output them, *ad seriatim,* to mass_hhs.csv, mass_dcf.csv, mass_dds.csv, mass_hhs_dcf_dds.csv, harvard.csv, harvard_and_mass_hhs_dcf_dds.csv, hhs.csv, dcf.csv and hhs_and_dcf.csv), CSV.zip, Attachm. 13.

78.   C.S.V. files are commonly used to store data in a compatible format that is easily imported into end-user applications, *e.g.,* Microsoft Excel, and various SQL servers.

79.   To automate, *inter alia*, authentication and compilation of the code, execution of the program and authentication and preservation of the results, I wrote a "makefile." *See* Makefile, CSV.zip, Attachm. 13.

80.   Makefiles are a common and well-accepted programming technique used by some of the most popular softwares, *e.g.,* the Linux kernels inside every Android device and all 500 of the world's fastest supercomputers.

81.   My Makefile uses the sha256sum command to create a Secure Hashing Algorithm (SHA) 256-bit checksum for every relevant file. *See, e.g., id.* at line 5 (creating clock_properties.h.sha256 by running sha256sum on clock_properties.h).

82.   A checksum is a relatively short number, usually expressed in hexadecimal, produced by an algorithm that, *e.g.,* reads every bit of a computer file such that changing a single bit in even a very large file would be expected to result in a different checksum. For any 256-bit hashing algorithm, there are more than 10^{77} possible resultant checksums. The possibility that two files would have the

same checksum is thus miniscule and, if it occurred, would be called a collision.

83.   Checksumming is the dominant method for verifying the authenticity of files stored on media and transferred over networks. Various Internet protocols, for example, use checksums to detect transmission errors, including the Transmission Control Protocol (T.C.P.) that undergirds the World-wide Web. The F.B.I. uses checksums in its data forensics, to authenticate files and ensure they have not been changed.

84.   The National Security Agency (N.S.A.) designed the 256-bit version of the SHA algorithm and it was first published by the National Institute of Standards and Tecnology (NIST). It is part of Federal Information Processing Standard 180-2. Like all checksum algorithms, SHA was evaluated to ensure low odds of collisions. SHA is the dominant algorithm for applications such as those herein described.

85.   The Court may reasonably be assured that files matching the 256-bit SHA checksums, *infra*, are authentic.

86.   I set the Makefile to record the relevant hardware and software states of the machine on which the program runs. *See, e.g.,* Makefile at lines 140–61, CSV.zip, Attachm. 13.

87.   I set the Makefile to use the cppcheck utility to look for programming errors that could cause inaccurate results. *See id.* at line 215.

88.   cppcheck is a widely used programming tool to look for such errors.

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89.   When run on my program, cppcheck reported no errors. *See* cppcheck.log, CSV.zip, Attachm. 13.

90.   I further set the Makefile to run the program through Valgrind, a widely used memory debugger. *See* Makefile, *supra*, at line 162.

91.   Memory debuggers are used to detect programming mistakes that, in a program such as this one, could lead to inaccurate results.

92.   When the program was run through Valgrind no errors were detected. *See* log.txt at line 1671, CSV.zip, Attachm. 13.

93.   I set the program to use haveged as its entropy source, i.e. for generating the random numbers used in the simulations of case assignments. *See* calc.h at line 32, CSV.zip, Attachm. 13.

94.   haveged is a widely used, cryptographically verified, entropy source. It has been audited by, *inter alia*, the French National Institute for Research in Computer Science and Control. *See* Seznec, Sendrier, *HAVEGE: A user-level software heuristic for generating empirically strong random numbers* (2003), *available at* https://www.researchgate.net/publication/220136317_HAVEGE_A_user-level_software_heuristic_for_generating_empirically_strong_random_numbers (last accessed Feb. 1, 2024).

95.   I set the program to record haveged's standard error stream, which haveged would use to report any errors. *See* user_random.c at line 59, CSV.zip, Attachm. 13.

96.   haveged did not report any errors, but did report that it sent over 2.5 terabytes through its entropy stream to my program. *See* haveged.stderr.txt, CSV.zip, Attachm. 13.

97.   I further set the program to duplicate the entropy stream used to simulate the judges' assignments and send the duplicate through FIPS 140-2 randomness testing using the rngtest utility. *See id.* at line 23.

98.   FIPS 140-2 tests are used to verify the randomness of an entropy stream for cryptographic purposes.

99.   The FIPS 140-2 randomness testing indicated that the haveged entropy stream was sufficiently random. *See* rngtest0.stderr.txt and rngtest1.stderr.txt, CSV.zip, Attachm. 13. (A valid entropy stream will have a small percentage of FIPS 140-2 "failures." For purposes such as this one, filtering out those failures would lead to less-random results.)

100. I further set my program to sample 100 million individual bits from the entropy stream and represent them as coin flips. *See* user_random.c at lines 161–87, CSV.zip, Attachm. 13.

101. My program reported: "After 100,000,000 coin flips, the results are 49,997,047 heads and 50,002,953 tails (user_random.c:185 test_user_random())." *See* log.txt at line 1721, CSV.zip, Attachm. 13. This is within 0.003 percent of even, and well within expectations.

102. I further set my program to record 256 million 8-bit samples from the entropy stream. *See* user_random.c at lines 197–223; frequencies_zero-to-255.csv, CSV.zip, Attachm. 13.

103. Using that output I created the chart Eight-bit Entropy Frequency Distribution, Attachm. 15. The frequency distribution indicates a proper entropy stream. The mean value received was 127.5029062, within 0.0030 of the median expectation.

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104. I further set my program to record 276 million modulo-unbiased 9-bit samples between 0 and 275. *See* user_random.c at lines 234-61, CSV.zip, Attachm. 13.

105. Using that output I created the chart Zero-275 Entropy Frequency Distribution, Attachm. 16. The frequency distribution indicates a proper entropy stream. The mean value received was 137.4976838, within 0.0024 of the median expectation.

106. I further set my program to run 100 million simulations of each of three test datasets that are easily contrasted to expectations, and record the results of each test set to a distinct C.S.V. file. *See* calc.c at lines 494-519; log.txt at lines 1736-61, CSV.zip, Attachm. 13.

107. Each test dataset had fives judges: Lynch, Torruella, Selya, Lipez and Howard.

108. For each test dataset I composed a "Control" curve, representing the expected frequency distribution.

109. The first test dataset had four cases and each judge's odds of assignment to each case were 1:2 or fifty percent. *See* circuit_data.h at lines 36-50, CSV.zip, Attachm. 13.

110. The control curve for the first dataset is $f(n) = (100000000)(1/2)^n(1/2)^{4-n}(4!/n!/((4-n)!))$.

111. Using the output from the first test dataset I created the chart First Test Dataset Frequency Distribution, Attachm. 17. The frequencies of assignments from the simulations align with the control curve to such an extent that the chart's lines are all on top of each other at any scale presentable on 8½x11-inch paper.

112. The second test dataset had eight cases and each judge's odds of assignment to each case were 1:8 or 12.5 percent. *See* circuit_data.h at lines 52-74, CSV.zip, Attachm. 13.

113. The control curve for the second test dataset is $f(n) = (100000000)(1/8)^n (7/8)^{8-n} (8!/n!/((8-n)!))$.

114. Using the output from the second test dataset I created the chart Second Test Dataset Frequency Distribution, Attachm. 18. Again, the frequencies of assignments from the simulations align with the control curve to such an extent that the chart's lines are all on top of each other at any scale presentable on 8½x11-inch paper.

115. The third test dataset had 20 cases and each judge's odds of assignment to each case were 15:20, or 3:4, or 75 percent. *See* circuit_data.h at lines 76-112, CSV.zip, Attachm. 13.

116. The control curve for the third test dataset is $f(n) = (100000000)(3/4)^n (1/4)^{20-n} (20!/n!/((20-n)!))$.

117. Using that output I created the chart Third Test Dataset Frequency Distribution, Attachm. 19. Again, the frequencies of assignments from the simulations align with the control curve to such an extent that the chart's lines are all on top of each other at any scale presentable on 8½x11-inch paper.

118. Based on the results, *supra*, of cppcheck, Valgrind, rngtest, the frequency-distribution tests and test dataset simulations, I conclude the program is a reliable simulator of case assignments and produces accurate results.

119. For the non-test datasets, the program calculated each judge's assignment odds by cross-referencing the decision date with

the data from Attributed First Circuit Panel Decisions Per Year and By

 Selected Judges, Attachm. 1. For example, the program calculated

that Judge Lynch's odds of assignment to any case in 2000 were

160:480, or 1:3, because Judge Lynch was listed on 160 of the court's

480 relevant decisions in that year.

120. The first set of simulations corresponded to the 10 cases

found in First Circuit "Massachusetts"—"HHS" & Similar Decisions

Postdating May 8, 1995, Attachm. 4. Using that output I created the

chart First Circuit "Massachusetts"-"HHS" & Similar Case Assignments

Expected Freq. Distr., Attachm. 20.

121. The second set of simulations corresponded to the nine cases

found in Filtered First Circuit "DCF"-type Decisions in Mass. Cases,

Attachm. 7. Using that output I created the chart First Circuit

Massachusetts "DCF"-type Case Assignments Expected Freq. Distr.,

Attachm. 21.

122. The third set of simulations corresponded to the five cases

from First Circuit "Massachusetts" "Developmental Services"-type

Decisions Postdating May 8, 1995, Attachm. 10 from this millennium.

Using that output I created the chart First Circuit "Massachusetts"

"Developmental Services"-type Case Assignments Expected Freq. Distr.,

Attachm. 22.

123. The fourth set of simulations corresponded to the 23 cases

from the three sets directly above. Using that output I created the

chart First Circuit "Massachusetts" "DCF" and "Developmental

Services"-type Case Assignments Expected Freq. Distr., Attachm. 23.

124. The fifth set of simulations corresponded to the nine cases from Filtered First Circuit "Harvard College"-type Decisions Postdating May 8, 1995, Attachm. 12. Using that output I created the chart First Circuit "Harvard"-type Case Assignments Expected Freq. Distr., Attachm. 24.

125. The sixth set of simulations corresponded to the 32 cases from the first five datasets, above. (Some cases appeared in multiple datasets.) Using that output I created the chart First Circuit "Harvard" and "Massachusetts" "HHS" "DCF" & DDS-type Case Assignments Expected Freq. Distr., Attachm. 25.

126. The seventh set of simulations corresponded to the 91 cases in First Circuit "HHS" & Similar Decisions Per Year and By Judges Lynch & Torruella, Attachm. 2. Using that output I created the chart First Circuit "HHS"-type Case Assignments Expected Freq. Distr., Attachm. 26.

127. The eighth set of simulations corresponded to the 91 cases in Reviewed First Circuit "DCF"-type Decisions Postdating May 8, 1995, Attachm. 5. Using that output I created the chart First Circuit "DCF"-type Case Assignments Expected Freq. Distr., Attachm. 27.

128. The final set of simulations corresponded to the 170 cases from the above two sets. (Some cases appeared in both sets.) Using that output I created the chart First Circuit "HHS" and "DCF"-type Case Assignments Expected Freq. Distr., Attachm. 28.

Electronic Signature

I declare the foregoing is true and correct under the penalty of perjury under the laws of the United States of America. 28 U.S.C. §§ 1746, 2242. Executed Thursday, February 1, 2023,

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For holographic execution, *see*, Accompanying Verification.